Design Information System of Field Experience Practice Using The Waterfall Model

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Article Information

A B S T R A C T

The outcomes of the evaluation will show how well students applied their knowledge in the implementation of the field experience practice. Evaluation is an assessment of the preparation and implementation of the learning process, personal and social abilities, and student reports. Based on this, the researcher wants to design an information system of Field Experience Practice (PPL), in order to help students, Supervisors (DPL), and tutor in obtaining information about Field Experience Practice (PPL) easily, quickly and accurately. Design of the Information system uses the R&D or Research and Development method with the development method SDLC or System Development Life Cycle and the Waterfall model. The design of this information system uses the SDLC model which consists of (1) communication, communication to the user to collect data and information about field experience practice according on the user's demands, (2) Planning is the process of creating a strategy for working on software that contains various tasks to be completed, risks that may occur, resources required, ultimate results to be produced, and process timetables, (3) Modeling is the process of turning requirements into a software design so that they may be validated before coding, (4) construction is the coding process of making an information system, (5) Deployment is the final stage in the construction of a software. The results of the research are presented in the form of an information system that is used by administrators, supervisors, tutors, and students. The results of the validity test were 0.75 with the valid category of 3 experts, the practicality test results were 0.85 with the high category of 3 experts, and the results of the effectiveness test were 0.88 with the high category of 15 students.

1. Introduction

Field Experience Practice or PPL is a final semester course for Sjech M. Djamil Djambek Bukittinggi State Islamic University students that provides applied training from classroom theory. The aim of PPL is to prepare students to become professional teaching candidates in accordance with competency-based education concepts. These skills include pedagogic, personality, professional, and social competencies [1].

Based on the researcher's interview with the Deputy Dean 1 of the Faculty of Tarbiyah and Teaching Science, Sjech M. Djamil Djambek Bukittinggi State Islamic University on 1 November 2022, associated with PPL at Sjech M. Djamil Djambek Bukittinggi State Islamic University, the problem encountered in the process of Field Experience Practice (PPL) is the difficulty of monitoring PPL students, especially in domicile-based Field Experience Practice (PPL) which is carried out in many different places and there is no

special portal in this PPL so that files are still being sent manually. Based on this, in order to assist Supervisors (DPL), tutor and students during the Field Experience Practice (PPL), As a result, an information system that can assist and support the implementation of PPL is required, so that all information can be retrieved quickly, precisely, and accurately. So that the Field Experience Practice (PPL) implementation can proceed smoothly thereafter.

Several studies have discussed the application of Field Experience Practice for various institutions such as the management of Field Supervisors [2], tutors management [3][4], student management [5], student presence [6], student activity [7][8], and student assessment [9][10]. Based on this explanation, the researcher initiated a study with the title "Design Information System Of Field Experience Practice Using The Waterfall Model".

2. Method

2.1. Development Model

The development model used is waterfall. Waterfall is a model that is systematic or sequential in the development of a software. The actual name of this method is "Linear Sequential Model". This model is commonly referred to as "Classic Life Cycle" or Waterfall [11]. Waterfall itself means a waterfall that flows from top to bottom so that the stages that are passed must wait for the completion of the previous stage and run sequentially. The several phases in the waterfall model according to Pressman are as shown in Figure 1 [12].
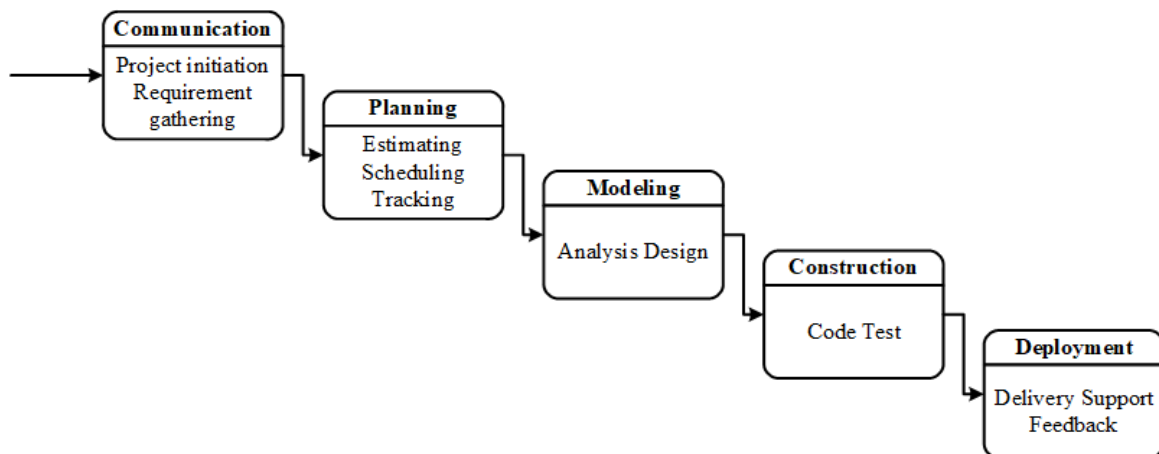

Figure 1. Waterfall Model

Explanation of Figure 1 is as follows : (a) communication is the first step by communicating with users in collecting data and information about PPL according to user needs; (b) planning is the process of creating a strategy for working on software that contains various tasks to be completed, risks that may occur, resources required, ultimate results to be produced, and process timetables [13]; (c) modeling is the process of turning requirements into a software design so that they may be validated before coding; (d) construction is the process of creating code in an information system. Following the coding step, the testing phase is carried out utilizing black box testing. Black box testing is software testing in terms of utility without verifying the design and program code to the required requirements [14]; and (e) deployment is the final stage in the construction of a software.

2.2. Product Test

This product test is carried out by researchers so that the validity of the research product is guaranteed, the product test consists of :

2.2.1. Product validity test

The validity test was carried out by several experts. The product is tested by comparing questionnaires on its evaluation. The validity test questionnaire responses are processed using the Aiken's V statistical formula, which is as follows [10] :

$$V = \sum \frac{s}{n(c-1)} \quad (1)$$

Description :

s = r – lo

r = the score given by the appraisers

lo = lowest validity research number

n = number of appraisers

c = the highest number of research validity

2.2.2. Product practicality test

In a study on the development of the model, it is said to be practical if experts and practitioners state that theoretically the model can be used in the field and the model's level of implementation is in the "good" category. The product practicality questionnaire results are analyzed using the kappa moment, as follows [10] :

$$k = \frac{p - pe}{1 - pe} \quad (2)$$

Description:

K : The kappa moment that shows the practicality of the product

P : The proportion that is realized, the total value is divided by the maximum number of values

Pe : The proportion that is not realized, the maximum value is reduced by the total number given by the examiner divided by the maximum number of values

2.2.3. Product effectiveness test

The effectiveness of this product is verified by evaluating a questionnaire completed by students. The effectiveness test questionnaire data are processed using Richard R. Hake's statistical formula (G-Score), as follows [10] :

$$<g> = \frac{(\% <sf> - \% <Si>)}{(100 - \% <Si>)} \quad (3)$$

Description:

<g> : G-Score

<Sf> : Score final

<Si> : Score initial

3. Results and Discussion

Result of this study is an information system of field experience practice (PPL) using codeigniter 3. This information system may input data for supervising lecturers, tutors and students, change data for supervisors, tutors, and students, delete data for supervisors, tutors, and students, fill in attendance, activities, and student assessments, and display attendance results, activities, and assessments for each PPL student at UIN Sjech M. Djamil Djambek Bukittinggi. Based on research on the Field Experience Practice Information System (PPL) at UIN Sjech M. Djamil Djambek Bukittinggi, it obtained application requirements in the form of documentation of tutor and student data as well as efficient monitoring of activities, attendance and assessment.

3.1. Communication (Project Innitiation, Requirements Ghatering)

At this stage, the researcher gathered information through interviews with relevant parties. Following the collection of data, various steps must be followed, namely : (a) project initiation, researchers identify the project, problems encountered, determine research objectives, research scope, problem analysis, and define features; (b) at this stage, the researcher determines the needs of both the user and the administrator. Furthermore, it defines.

3.2. Planning (Estimating, Schedulling, Tracking)

This stage consists of : (a) estimating the task, the researcher divides the task into several roles, namely, admins who are in charge of managing the system, and users who will become consumers of the products produced; (b) scheduling is done in accordance with the estimated product processing time; (c) tracking is the process of testing apps using the required media and software.

3.3. Modelling (Data Structure, Design)

In developing and constructing information systems with the Codeigniter 3 framework and the MVC (Model View Controller) application method [15]. Figure 2 is a use case diagram. In the PPL information system there are 4 actors namely admin, lecturers, teachers and students [16].
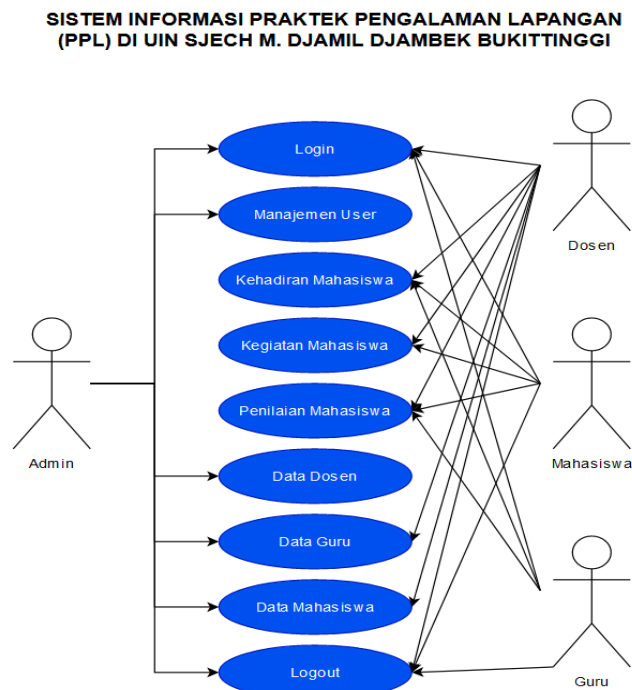

Figure 2. Use Case Diagram Information System of PPL

Figure 3 is the admin activity diagram. The PPL information system includes the activities of each actor, namely admin, lecturers, teachers and students [17]. Figure 3 depicts an admin activity diagram that includes system login, inputting a username and password, user management, lecturer data, teacher data, student data, and system logout.
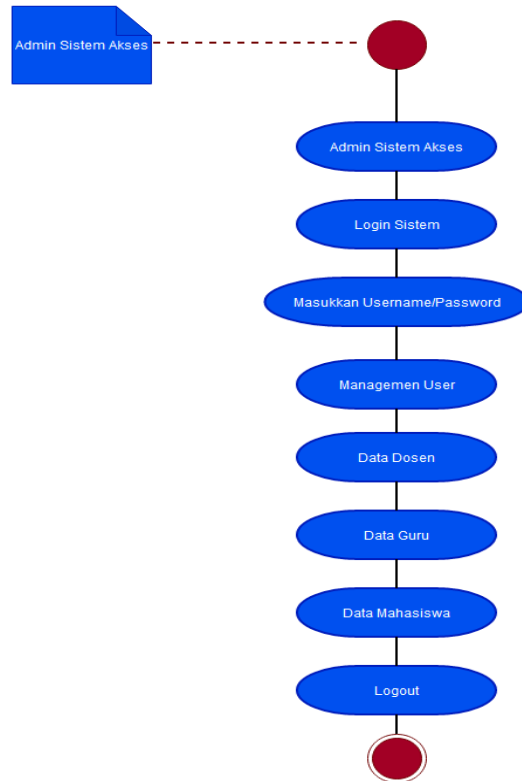

Figure 3. Admin Activity Diagrams

Figure 4 depicts the admin activity diagram, which includes system login, inputting a username and password, student attendance, student activities, student assessment, teacher data, student data, and system logout.
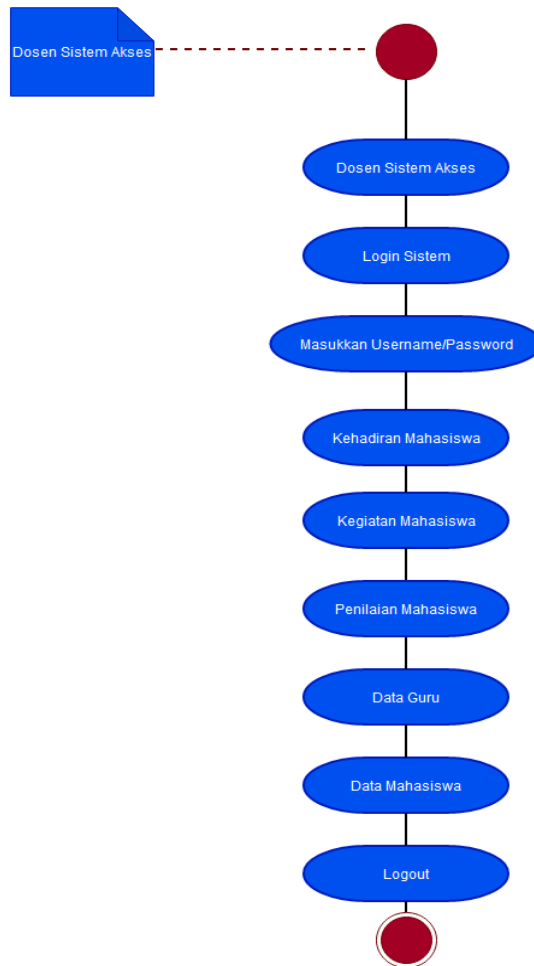
Figure 4. Activity Diagram Lecturers

Figure 5 depicts the teacher activity diagram, which includes system login, inputting username and password, student attendance, students assessment, and system logout.
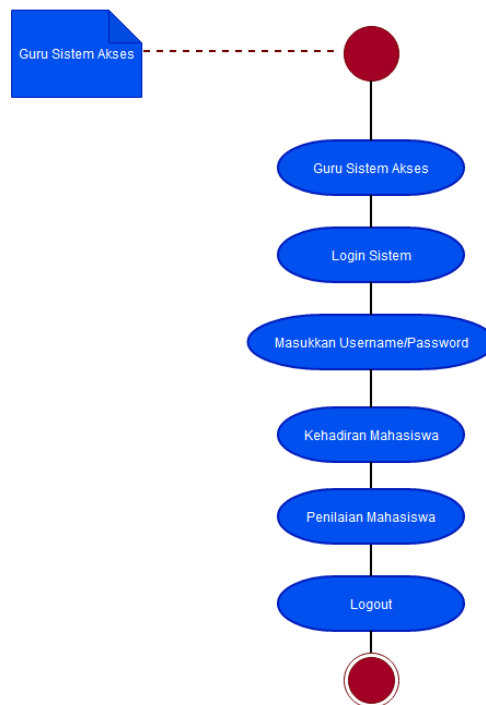

Figure 5. Activity Diagram Teachers

Figure 6 depicts a student activity diagram that includes system login, inputting a username and password, student attendance, student activities, student assessment, and system logout.
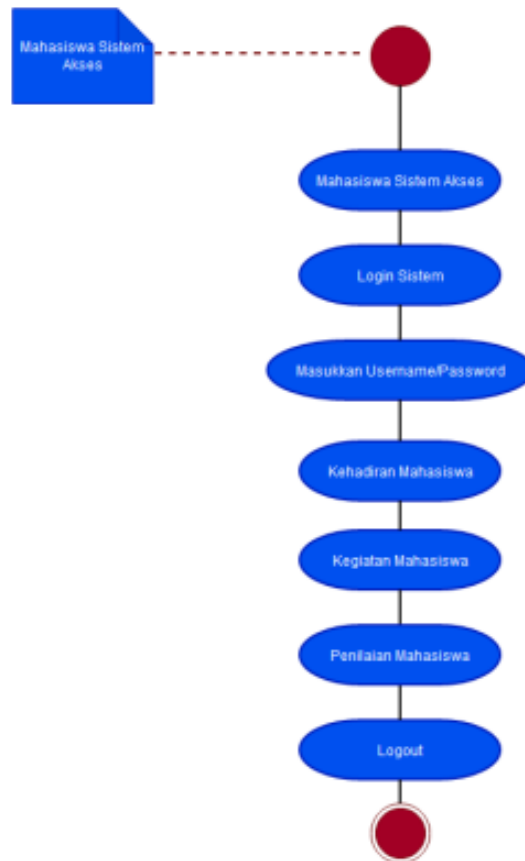

Figure 6. Activity Diagram Students

Sequence diagrams in the PPL information system include flows that are carried out systematically. Figure 7 depicts the admin sequence diagram, which includes system login, system login form, enter username and password, display the page, user management, lecturer data, teacher data, student data, and system logout.
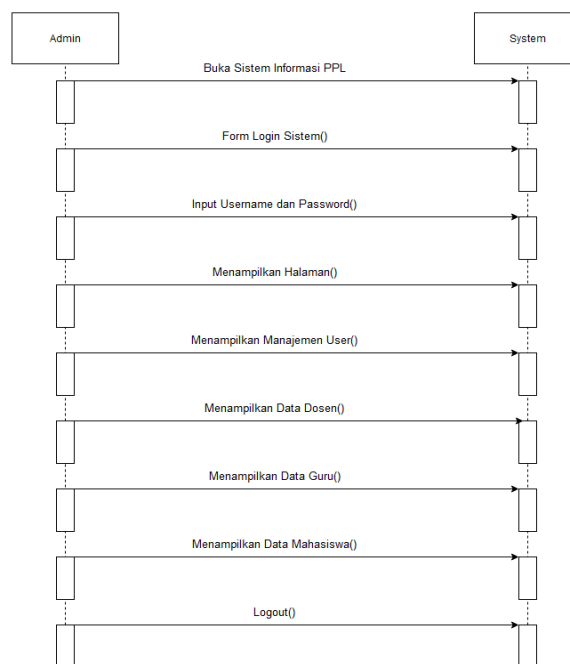

Figure 7. Sequence Diagram Admin

Figure 8 depicts the lecturer sequence diagram, which includes the system login form, inputting the username and password, displaying the page, student attendance, student activities, student assessment, displaying teacher data, displaying student data, and logging out.
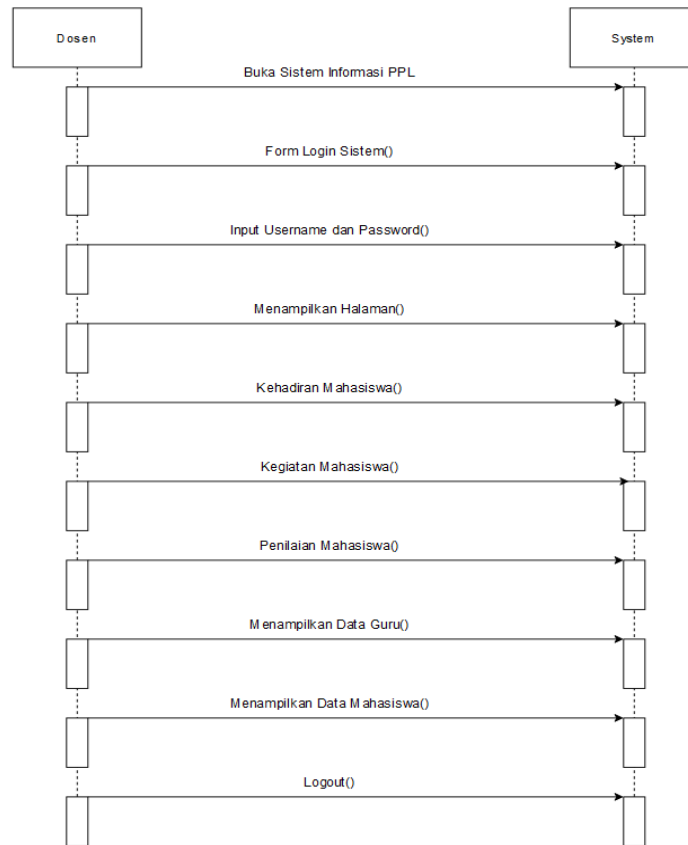

Figure 8. Sequence Diagram Lecturers

Figure 9 depicts the instructor sequence diagram, which includes a system login form, the input of a username and password, the display of a page, student attendance, student assessment, and system logout.
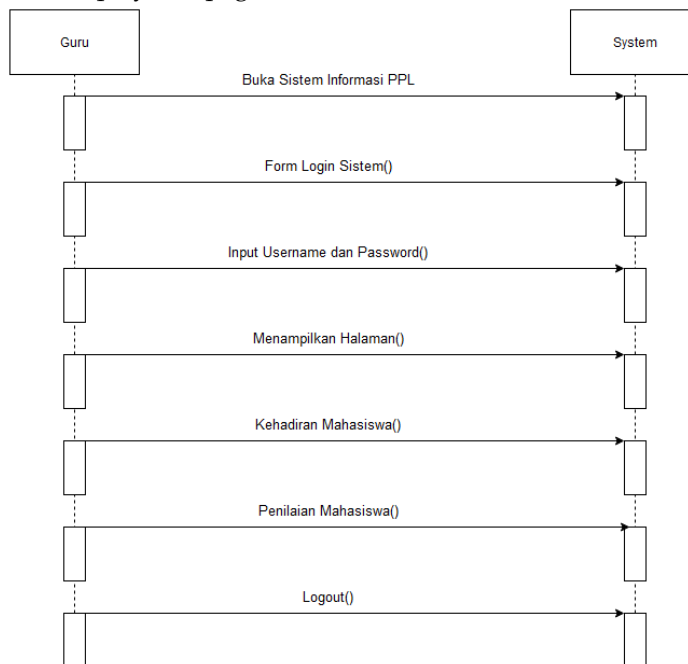

Figure 9. Sequence Diagram Teacher

Figure 10 depicts the student sequence diagram, which includes the system login form, username and password entry, page display, student attendance, student activities, student assessment, and system logout.
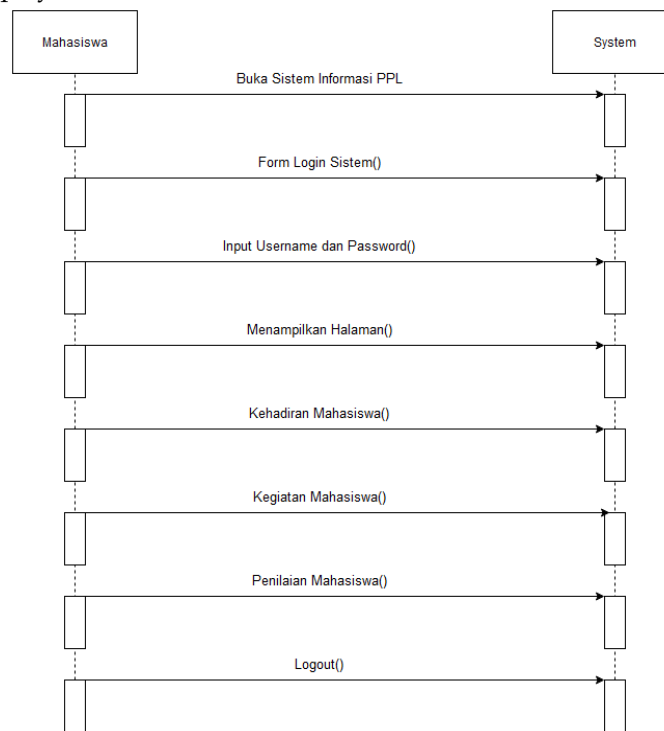

Figure 10. Sequence Diagram Students

Class diagrams in the PPL information system include modeling which is an image of the structure and description that is connected to other classes [18]. Figure 11 depicts the class diagram of the PPL information system to be designed.
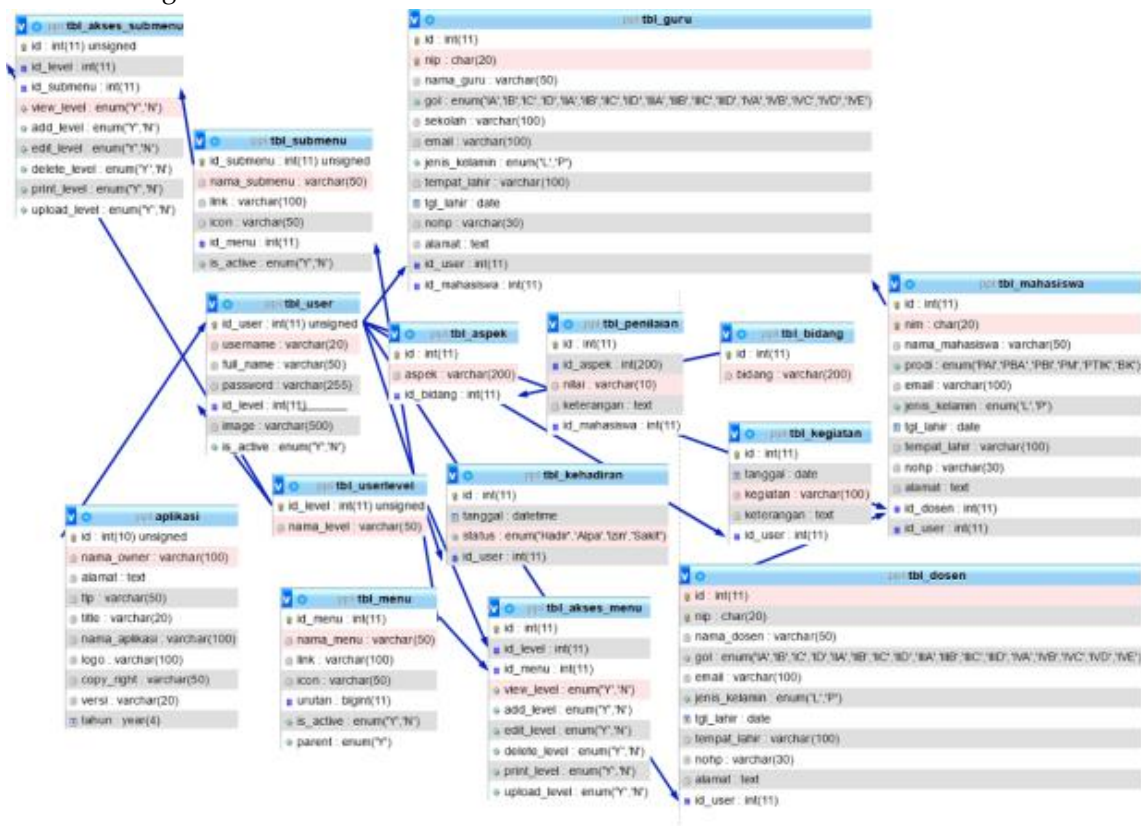

Figure 11. Class Diagram

The display design includes the existing designs in the PPL information system, namely the admin menu, lecturers, teachers and students. Figure 12 shows the login page display of the PPL information system before entering the application.
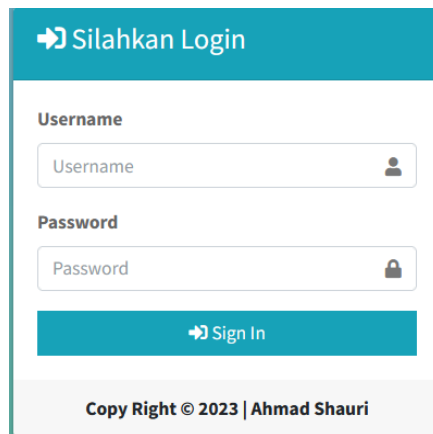

Figure 12. Login Page

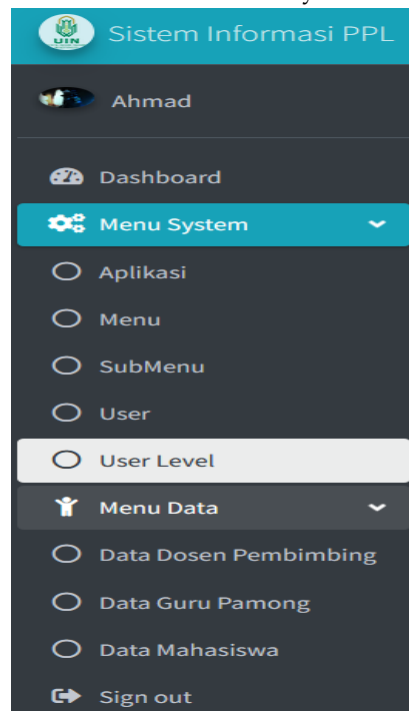Figure 13 depicts the appearance of the PPL information system's admin menu.

Figure 13. Admin Menu

Figure 14 depicts the PPL information system's lecturer menu display.
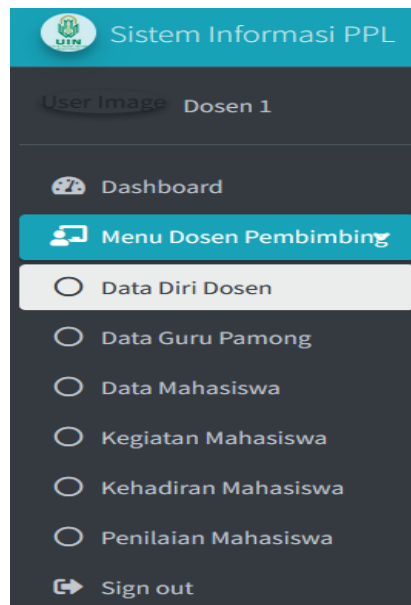
Figure 14. Lecturer Menu

Figure 15 depicts the PPL information system's display of the teacher's menu.
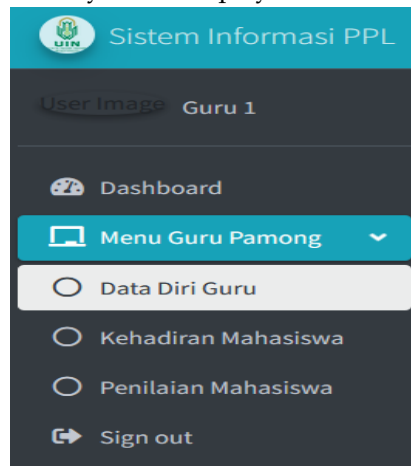

Figure 15. Teacher Menu

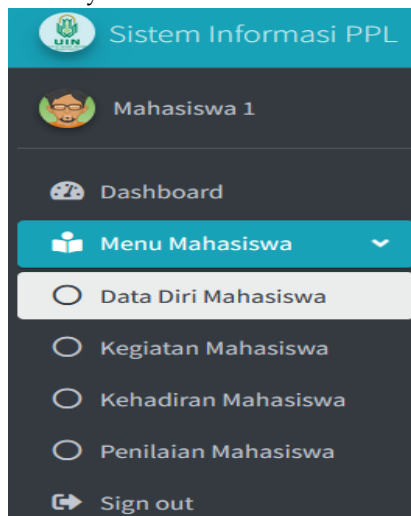Figure 16 depicts the PPL information system's student menu.

Figure 16. Student Menu

3.4. Construction

Construction is a coding process in making information systems.

3.5. Deployment (Delivery, Support, Fedback)

The final stage in the construction of a software by handing over the system to the user.

3.6. Product Test

The result of the validity test was 0.75 with the valid category of 3 experts, the result of the practicality test was 0.85 with the high category of 3 experts, and the result of the effectiveness test was 0.88 with the high category of 15 students.

4. Conclusion

Based on the research that has been done, the researcher can conclude that the Field Experience Practice Information System (PPL) at UIN Sjech M. Djamil Djambek Bukittinggi was successfully designed. The results of the responder analysis utilizing Richard R. Hake's statistical formula revealed that the information system of field experience practice had a high level of efficacy. The results of testing the validity of the information system practice field experience using the Aiken's V statistical formula show the results are in the valid category. The practicality test results of information systems from field experience using the kappa moment formula have a high level of practicality. So that the field experience practice information system that the researcher designed is stated to be valid, practical, effective.

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